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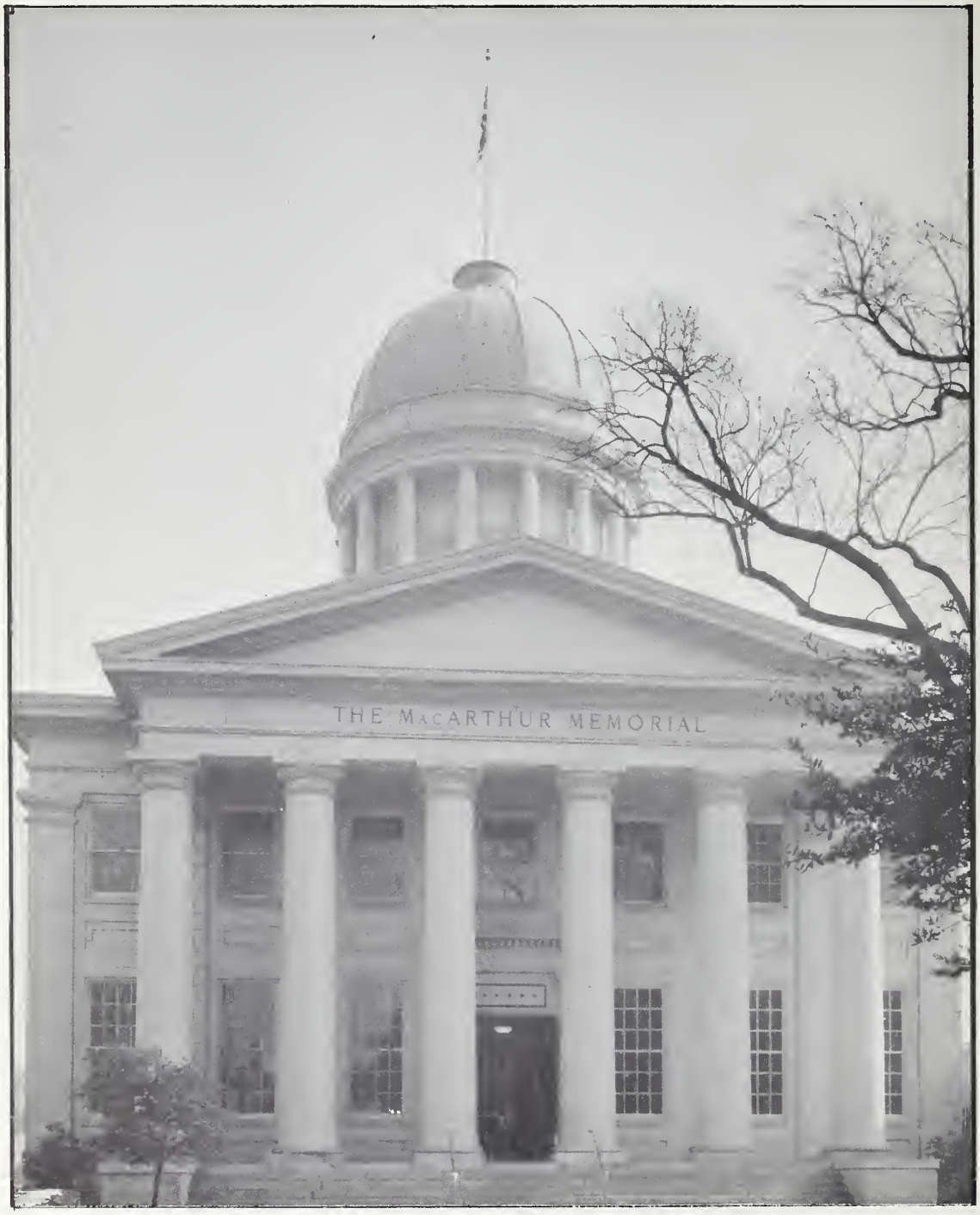
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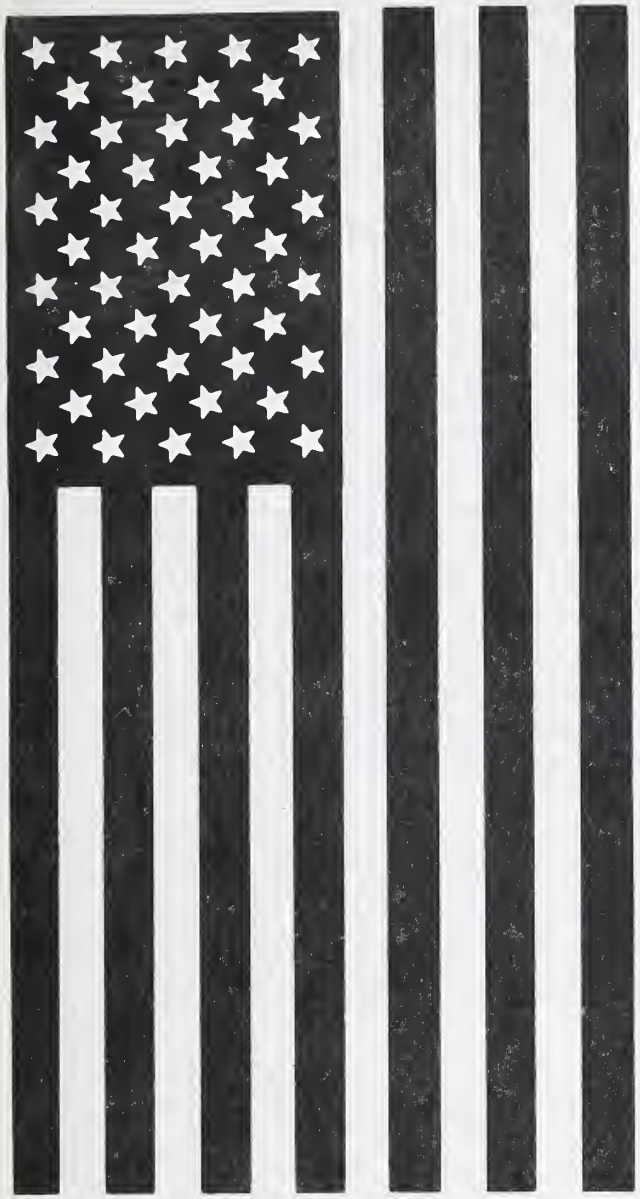

The
land
of the
free

and
the
home
of the
brave.....

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HEADQUARTERS
UNITED STATES ARMY MATERIEL COMMAND
WASHINGTON, D.C. 20315

AMC Pamphlet 385-89 MAY 1969

The Safety Digest is an AMC Pamphlet prepared by the Safety Office Headquarters, U. S. Army Materiel Command. Its purpose is to disseminate information which can materially influence and improve safety programs at all Command establishments.

Articles are included to supplement technical knowledge as well as practical knowledge gained through experience. They provide a basis for the further refinement of safety measures already incorporated in operating procedures and process layout. To achieve maximum effectiveness, the Safety Digest should be given widespread circulation at each AMC establishment.

Articles appearing in the Safety Digest are unclassified and are not copyrighted. They may be reproduced as desired in order to bring pertinent accident prevention information to the attention of all employees. The Army Materiel Command Safety Digest should be given a credit line when articles are extracted.

Unclassified material believed to be of interest or benefit to other establishments is welcome for publication in the Safety Digest. Please send articles for review to: U. S. Army Materiel Command Field Safety Agency, Charlestown, Indiana. If possible, include pictures, charts, drawings, and illustrations that clarify and heighten interest in your presentation.

(AMCSF)

*FOR THE COMMANDER:

ROBERT C. FORBES
Major General, USA
Chief of Staff

OFFICIAL:

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Colonel, GS
Chief, Administrative Office

Special Distribution

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LET'S CONCENTRATE ON MOTOR VEHICLE DRIVERS

Actual facts reported about motor vehicle accidents are likely to clash with some popular concepts of accident causes. This is particularly true if you limit your review to accidents within a single organization, such as the Army Materiel Command.

A review of accident reports on the 184 recordable Army motor vehicle accidents reported by AMC installations in the first seven months of FY 1969 revealed the highlights summarized below.

The review covered only those individual accidents which met the AR 385-40 definition of an Army motor vehicle accident. These must have involved operation of an Army motor vehicle and must have caused $100 damage or a disabling injury. Information shown on 184 accident reports, DA Form 285, was used.

Members of the general public were involved in many of AMC's Army motor vehicle accidents. The 184 vehicle accidents studied reflected involvement of 77 non-Army and 201 Army vehicles.

Accident report narratives revealed that 31 non-Army drivers shared accident responsibility with the Army drivers involved. (As used herein the term Army driver includes all authorized operators of Army-owned vehicles.)

Active Army personnel accumulated the worst record of total off-post accidents and Army contractors the best. Data was not available on the miles driven off post versus miles on post. The Active Army drivers were often young enlisted men. There was a wide age range among the civilian drivers of Army vehicles.

Driver Classification	Accidents On Post	Accidents Off Post	Total Accidents
Active Army	38	25	63
Army Civilian Employee	43	20	63
Other Personnel (Contractor)	51	7	58
	132	52	184

A very large share of the damaged Army vehicles consisted of light trucks, which often were used to transport one or two individuals rather than cargo, and passenger vehicles. Here are the leading general groups of vehicles that were involved:

Light trucks (1/2- to 2-ton)	-90
Trucks, 21/2-ton and over	-13
Sedans (28 light and 2 medium)	-30
Passenger buses	-17
Station wagons and carryalls	-14
Tractor-trailers (various capacities)	-25
All others	-12

Most of AMC's motor vehicle accidents were collisions. Vehicle accidents caused by mechanical failures were infrequent.

Collision with non-Army vehicle	-70
Collision with fixed object	-37
Collision with Army vehicle	-18
Collision with animals, trains, equipment	-14
Overturned	-29
Ran off roadway	- 6
Mechanical failure	- 3
Jackknifed	- 3
Improper coupling of tractor to trailer	- 2
Sideswiped	- 2

Weather was a factor in only 38 of 184 accidents. There were no surprises in weather conditions that contributed to the incidents.

Snow and ice	-20
Rain	-12
Fog	- 5
Extreme heat, humidity	- 1

The installation safety officers who analyzed the accidents found unsafe physical conditions to outnumber unsafe mechanical conditions as factors in Army motor vehicle accidents. Their analyses in this area agreed with their findings on weather as an accident factor.

Wet, rough, slippery surface	-28
Visibility restricted, obstructed	-10
Mechanical failure of equipment	- 8
Defective parts of vehicles	- 6

Hazardous arrangement of equipment/materials	- 5
Roadway obstructed, too narrow, unimproved	- 5
Unsafe arrangement of traffic devices	- 4
Uneven terrain, loose gravel on berm	- 2
Other unsafe mechanical or physical conditions	- 6
TOTAL unsafe mechanical or physical conditions identified by analysts	74

The supervisors of personnel who experienced these accidents fared poorly at the hands of installation safety analysts. However, the effectiveness of supervisors' efforts are more properly reflected in the 1st half, FY 1969 AMC 1.70 rate of Army motor vehicle accidents per 1,000,000 miles of operation, one of the best in the Army. When the three following tables are compared, these show a pattern of driver failures despite supervisory preventive actions.

The need for supervisory or managerial action was checked on 133 of the 184 accident reports. The following supervisory needs were scored:

More or improved instruction	-85
Improved supervision	-23
Better planning	-12
Other supervisory action, NEC	-12
Use of improper equipment, material	- 1

The 148 identified unsafe driver acts were violations of traffic safety practices ordinarily emphasized by supervisors, driving instructors and licensing examinations:

Excessive speed	-43
Failure to practice safe driving techniques	-39
Failure to yield right of way	-17
Improper backing	-10
Failure to ascertain clearance	-10
Improper turn	- 8
Operating without taking necessary safety precautions	- 7
Following too closely	- 6
Improper parking	- 3
Sleeping when wakefulness was necessary	- 2
Horseplay while operating a vehicle without authority	- 1
Other unsafe accidents, NEC	- 2

The list of unsafe personal factors contains one

item that appears to conflict with one of the listed needed supervisory actions. The analysts who said "more or improved instructions" were needed in 85 instances showed "inadequate knowledge or experience" as an unsafe factor on only 13 reports. "Failure to understand instructions" was cited on only one report. Several of the unsafe personal factors listed might yield to corrective actions other than instruction or training.

Inattentive, unobservant	-55
Failure to recognize or appreciate hazard	-36
Inadequate knowledge or experience	-13
Poor judgment	-11
Inability to judge distance, speed, clearance	-10
Wilful disregard of instructions	- 6
Improper physical condition	- 3
Intoxication	- 2
Fatigue	- 1
Failure to understand instructions	- 1
Reckless	- 1
TOTAL unsafe personal factors	140

The data summarized above is unlikely to suggest revolutionary ideas for preventing Army motor vehicle accidents. However, it does pinpoint the responsibility for the accidents on the drivers. In a very high portion of the accidents they were guilty of unsafe acts and unsafe personal factors. Improvement in the quality of driving should help reduce Army motor vehicle accidents.

▶Here are several conclusions that appear to be supported by the data:

1. Improvement in the Army motor vehicle accident record depends upon better driver performance.

2. "More or improved instruction" on the part of the supervisor could do much to improve the record. Detect and retrain drivers with records of bad driver habits especially those whose record show minor accidents.

3. Mechanical failure caused a very small part of the AMC Army motor vehicle accidents.

4. No group of drivers have a monopoly on Army motor vehicle accidents. An accident may occur when any driver fails to avoid attitudes or acts that permit him to be trapped in an accident situation.

■ What can we do to reduce the number of Army motor vehicle accidents? ◉Here are some suggestions:

1. Concentrate the accident prevention effort on the individual vehicle operator.

2. Watch the drivers and reassign to other duties those who display undesirable habits or traits, such as driving at unsafe speeds, poor judgment and inattention. Undetected and uncorrected, these will eventually lead the individual into an accident situation.

3. Curtail to the extent possible driving when unfavorable climatic conditions prevail. Many work assignments can be revised to postpone driving until later when ice and snow are gone from the roads.

4. When you do train vehicle operators, do a thorough job of it. Quality training presented by good teachers is obviously more productive than quantity training given by unskilled personnel. Use the best instructor you can obtain.

5. Be realistic in what you teach. Emphasize the things that cause the accidents. While safety in backing is important, driving too fast for conditions causes the worst accidents.

6. Teach defensive driving and enforce it on post. The driver who practices defensive driving at work should be influenced to practice it wherever he drives.

7. Emphasize enforcement of all traffic rules on post.

8. Emphasize use of available safety devices, such as safety belts. These will prevent or lessen the severity of many injuries.

9. Require non-Army drivers to obey traffic rules and to drive safely on post. Unsafe operation of non-Army vehicles on installation streets has caused several fatalities in the last year.

10. Supervisors and managers at all levels should continually insist on safe driving.

Excessive speed and unsafe driving techniques are leading unsafe acts cited on reports of Army motor vehicle accidents. The driver of the vehicle shown above appeared to be guilty of both of these. He was driving too fast to negotiate the curve safely, and he applied his brakes hard. The brakes locked. The vehicle skidded off the road and rolled over several times. The driver was unhurt, but damage to the one-half ton truck exceeded $1,000.

****

TOOELE ARMY DEPOT RECEIVES AMC COMMENDATION FOR SAFETY

Colonel Beverley F. O'Neal, Jr. (right) Commanding Officer, is shown accepting an AMC Commendation for Safety from Colonel E. L. Snapp, AMC. The award was one of three earned by the Depot during FY 1968. The other awards were the American Trucking Association Safety Award and the National Safety Council Award of Merit.

NATIONAL SAFE BOATING WEEK

President Nixon has proclaimed the week beginning June 29, 1969 as National Safe Boating Week. His proclamation urges us to take advantage of educational courses in boating safety, and all those who use our waterways for boating to exercise courtesy and apply safe boating practices.

The summer season may seem far away but it is not too soon for boating enthusiasts to follow the President's guidance.

U. S. Coast Guard boating statistics reveal that the year 1967 produced accidents involving 5,274 small boats, resulting in 1,312 fatalities and 1,365 injuries. Over fifty percent of these accidents were judged to be the fault of the operator. Expert testimony on Small Boat Safety before the House Committee on Merchant Marine and Fisheries revealed carelessness and lack of knowledge as major contributors to boating accidents.

A number of services are available to you from the U. S. Coast Guard Auxiliary. These include a course in Basic Seamanship (one two-hour class for eight weeks), Outboard Motorboat Handling, and Safe Boating (one two-hour class for three weeks). Also available is a Courtesy Motorboat Examination and other services which can be arranged with your local auxiliary. Write to the Director of the Auxiliary nearest to you.

1st Coast Guard District
J.F. Kennedy Federal Bldg.
Government Center
Boston, Mass. 02203

2d Coast Guard District
Federal Building
1520 Market Street
St. Louis, Missouri 63103

2d Coast Guard District (SR)
570 U. S. Courthouse
801 Broadway
Nashville, Tennessee 37203

7th Coast Guard District
51 S. W. First Avenue
Miami, Florida 33130

8th Coast Guard District
Custom House
New Orleans, Louisiana 70130

9th Coast Guard District
New Federal Building
1240 E. 9th Street,Rm.2021
Cleveland, Ohio 44114

2d Coast Guard District (ER)
8413 Federal Office Building
550 Main Street
Cincinnati, Ohio 45202

2d Coast Guard District (NR)
301 Post Office & Courthouse
Bldg.
Dubuque, Iowa 52001

3d Coast Guard District (NA)
Governors Island
New York, N. Y. 10004

3d Coast Guard District (SA)
Coast Guard Base Gloucester
King and Cumberland Streets
Gloucester, New Jersey 08030

5th Coast Guard District
431 Crawford Street
Portsmouth, Virginia 23705

11th Coast Guard District
19 Pine Avenue
Long Beach, Calif. 90802

12th Coast Guard District
630 Sansome Street
San Francisco, Calif. 94126

13th Coast Guard District
613 2d Avenue
Seattle, Washington 98104

14th Coast Guard District
677 Ala Moana Boulevard
Honolulu, Hawaii 96813

17th Coast Guard District
P. O. Box 3-5000
Juneau, Alaska 99801

U. S. Coast Guard Headquarters
1406 G Street, N. W.
Washington, D.C. 20591
Tel. (202) 964-5444

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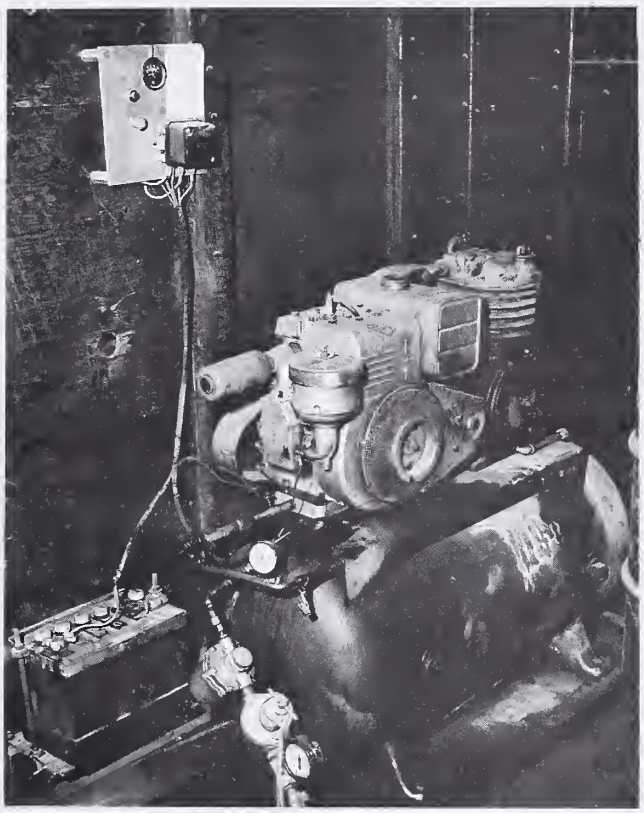
TIRED OF CRANKING? USE AN ELECTRIC STARTER

S. J. Ryan
Senior Engineer, Day & Zimmermann, Inc.
Lone Star Army Ammunition Plant

■ At Lone Star Army Ammunition Plant truck-mounted air compressors are used when vehicle tires are repaired and heavy equipment is lubricated in the field. Prior to the installation of electric starters on these engines several first aid cases occurred while the motors were being hand cranked. In two of these cases the cranking handle slipped off the shaft and struck the operators on the forehead.

The electric starter eliminates a cranking hazard and saves valuable minutes in starting the engine. Our Safety Department feels that the cost of installation of these starters is justified in the elimination of a source of injuries.

Electric starters can be obtained commercially. They may be purchased as a kit, consisting of a belt, pulley, switch and combination generator/ starter. The cost is approximately $50, plus battery, and a few hours of labor to install.



This compressor, with an electric starter activated by pushing a button, is used in place of one that was started with a cranking handle.

SECRETARY ISSUES NEW FEDERAL SUPPLY CONTRACT RULES

As one of his final official acts, outgoing Secretary of Labor Willard Wirtz approved revisions in the safety and health standards issued under the Walsh-Healey Public Contracts Act. The preceding standards had been in effect since December 1960. The revised standards appeared in the Federal Register, January 17, 1969.

In September of last year, proposed revisions were published in the Federal Register and a public hearing was held November 6-8, 1968. Thirty organizations participated in the hearing, and over 130 submitted comments which were made a part of the record.

Some of the highlights of the revised standards are:

1. Adoption by reference of nationally recognized consensus standards.

2. Adoption by reference of other Federal agency regulations, such as the ordnance standards of the Department of Defense and the hazardous materials standards of the Department of Transportation.

3. Adoption of an occupational noise standard. It has been recognized for several years that noise was and is an increasing hazard to everyday life. President Johnson, on November 4, 1968, issued a report of the Federal Council for Science and Technology on the scope and nature of the problem. The report indicates that "A minimum of six million and perhaps as many as 16 million industrial workers are threatened with degrees of loss of hearing from exposure to noise on the job." The report recommends that the Walsh-Healey standards establish definitive requirements. Such a requirement will be established as follows: A level of 85 decibels has been set for attainment by January 1,1971. Recognizing, however, that some industries may have trouble in reducing noise levels prior to that time, an interim level of 92 decibels will be set if a firm starts audiometric testing of employees subject to high noise levels and establishes a plan which will result in reduction to the 85 decibel standards by January 1971.

■ 4. Adoption of stricter standards to control air contaminants. Since 1960, the Walsh-Healey standards have set requirements for employees subjected to dusts, fumes, mists, etc. These have been and will continue to be enforced. However, to keep standards current, we have adopted the Threshold Limit Values set forth by the American Conference of Governmental Industrial Hygienists with certain exceptions. Such exceptions are those current standards which have been issued by the U.S. of America Standards Institute, and in the area of dusts, the new standard of the U.S. Public Health Service for coal dust. The coal dust standard establishes a limit so that miners will not be subjected to coal miners pneumoconiosis, which has resulted in serious illness and an alarming number of deaths among miners.

****

AVIATION MATERIEL LABORATORIES RECEIVES AMC AWARD OF MERIT

The U. S. Army Aviation Materiel Laboratories, Fort Eustis, Virginia, has received the AMC Award of Merit for Safety for FY 1968. The citation was presented by BG John P. Traylor (left), Deputy Commanding General, U. S. Army Aviation Systems Command. Shown receiving the citation are Curtis M. Mull, COL Eduardo M. Soler, Commanding Officer, and LTC Robert D. Proctor. The AVLABS Safety Officer is James J. Fetzer.

THE TRAVELING SALESMAN

■■■ All of us have heard many stories about the traveling salesman--his many affairs, the trouble he gets into and the trouble he gets out of, the product he sells and the quality of his pitch. We pilots are no different. We travel; we are salesmen (whether you realize it or not), and you hear many stories about us. The stories are sometimes exciting and sometimes dull; sometimes good and sometimes bad; sometimes funny and too many times sad. Sometimes they are told by us and sometimes about us. Yes, we pilots are salesmen. Whether we make a sale or not depends upon the quality of our service, or, in other words, whether we are just an airplane driver or a professional in our field.

One of the best measurements of differences between airplane drivers and pilots was recently provided by the Chief Pilot-Los Angeles of the Flying Tiger Line. He states - "There are lots of airplane drivers, but pilots, in the best sense of the word, are not so plentiful. The drivers get an airplane from here to there, but give little thought to finesse. If something goes wrong, they may end up a statistic. This is not because they are unintelligent, but because their flight judgment is terrible."

"The professional pilot, on the other hand, is ahead of the flight, the crew and the aircraft at all times. He has pre-planned the flight for all contingencies and stays abreast of developments. He flies smoothly, precisely and courteously. When the flight is completed safely, it is not a matter of luck; it is because he planned it that way."

How many times have you had the misfortune to act as a co-pilot for a member of the former group? Worse yet is to be a passenger on board the same flight. Fortunately, most of these flights end up in a routine manner rather than a statistic. At times it appears that this is in spite of, rather than because of, the driver at the controls.

Let's look at some of the characteristics that make up the non-professional airplane driver, and see what sort of reflection he casts upon aviation.

Appearance is our first clue. Many times pilots have reported for flights when their appearance didn't conform to the standards as accepted by the military. Dirty clothing, unpressed clothing, clothes not worn as prescribed, mixture of clothing, not shaven are a few of the distinctive marks of the non-professional. Of course there are exceptions to almost every rule, and during times of maneuvers or combat, it isn't always the easiest thing to stay neat and clean. Even during these conditions, the professional will be found putting forth every effort to present a neat and clean appearance. To paraphrase an old saying, "A neat and clean pilot is not always a professional pilot, but a professional pilot is always neat and clean."

Courtesy is something all of us have, but some of us fail to use very often. How many times have you observed the pilot who greeted his passengers as if they were a bother to him, or would not wait for passengers or cargo that was late, just because it was an inconvenience to wait a few minutes. Or how about the guy that can't be bothered with, or very impatiently gives emergency instructions to passengers. Let's face it - our only commodity is service, and without those passengers and cargo there is very little service left for us. Without passengers and cargo most of us would not have a job.

Courtesy goes a long way toward making a comfortable and enjoyable flight for passengers. It is also showing respect for other aircraft, and other persons not directly involved with your particular flight. Nothing tends to agitate anyone quicker than dusting them off with blowing sand and small boulders from prop blast or rotor wash. To illustrate - Not long ago a medium cargo helicopter hovered right up to the reviewing stand where his passenger was to stand. The reviewing stand had been decorated with bunting and had chairs for the dignitaries to sit in. Some of the dignitaries were already on the stand and color guards were nearby holding the different ceremonial and parade flags.

It was a sight to behold as the helicopter came hovering in rapidly. Chairs were blown off the stand; bunting was torn loose from its anchors; dignitaries lost hats and almost lost their footing, and then almost disappearing over the hill were the color guards trying to keep up with their flags.

As the helicopter was lowered to the ground to come to rest on its wheels, and most of the waiting dignitaries had regained their composure and most of their clothes, the distinguished passenger disembarked from the vibrating machine. As he approached the stand, the vibrating machine suddenly came to life again and departed ever so gracefully and quickly into the blue.

As the dust and debris cleared enough to see, the recently regained composure had been lost and was frantically being sought once more and the newly arrived passenger was desperately trying to keep from falling up the steps of the reviewing stand. Off in the distance were the color guards not so gracefully trying to catch up with their flags again.

This is an example of a pilot that, in his endeavor to be as helpful and courteous to his passenger as he could, was being thoughtless and inconsiderate of others. At what level do you think Army Aviation stood in the eyes of those who were present at that little demonstration? Opinions formed there, by people of high rank, were not wiped out overnight.

How about the pilot who places himself, his passengers and his aircraft in an extremely dangerous situation. Many times you read of accidents that were caused whereby the pilot exceeded his abilities or the limitation of the aircraft in his efforts. Most common causes are flying into deteriorating weather (trying to maintain VFR in IFR conditions); flying too low; flying too slow; buzzing, and trying to extend fuel range. If he makes it, he certainly leaves an impression, but more than likely it isn't very favorable. Too often these flights end up as a statistic.

Then there are those that stamp an indelible impression upon their passengers by their expertise at the controls. The guy who leaps to a hover, does a couple of fast 360° pedal turns (to make sure some inconsiderate idiot isn't about to run into him), dumps the nose and pulls max power to accelerate to at least 100 knots while skimming over the ground at two feet, then pulls back on the cyclic to climb at 3,000-4,000 feet per minute (so that he'll have plenty of altitude in case of a forced landing). Or the guy that taxis out onto the runway, abruptly locks brakes, red lines the power, releases brakes and leaps into the air leaving

9,000 feet of unused runway (in case its needed for an emergency landing). Safely in the air, he makes his first on course correction which is 180°. He very deftly handles this maneuver by standing the aircraft on its wing (rotor) tip and with a little firm back pressure on the stick is now right on course. (This should really impress the passenger because it will save time.) At destination, another demonstration is put on. An autorotation with a full flare and power recovery gets him down in the minimum time or that steep approach with full flaps, power off, brakes locked type of landing shows that we only need 1,000 feet, at most, of that 10,000 ft. runway, and certainly saves on taxi time. Pilots must certainly be held in the highest esteem after these exhibitions of complete disregard for safety and comfort.

Let's not forget to mention the pilot-co-pilot team on an IFR flight. The team that sits right in front of the passengers and are observed in all that they do - the heated discussions and questions over which VOR should be tuned in, which radial he should be on, what altitude he should be at, what happened to the approach book; the frantic gestures and looks as the altimeter starts to fluctuate, the vertical velocity goes from 2,000 FPM descent to 2,000 FPM climb, the airspeed drops to zero all because he forgot to turn on pitot heat. These gyrations do not go unnoticed by the passengers in the back, and certainly do not lend themselves to a feeling of confidence in the crew.

Proficiency is another area in which many of us lack. Sometimes it is because we try to become qualified in so many aircraft, that the proficiency in any one of them is never truly maintained. The pilot does not exist who is proficient in all aircraft in all areas for which the aircraft was designed. This is readily apparent to the passenger as well as the pro when the not so proficient pilot is observed under stress, or confronted with an impending emergency.

What is our pilot's attitude toward a scheduled flight? After checking weather and finding there is a strong possibility that weather may be below minimums on his return, does he cancel the flight because it would inconvenience him to RON or are his passengers given the option to determine if the mission warrants a possible RON? A few cancellations by this pilot because of a negative attitude, rather than a "CAN DO"

attitude, would soon lose him customers.

Much more could be written about our friend the airplane driver and his unprofessional approach to a professional situation. We, as pilots, are our own worst enemies when we approach our job in such a manner. We need to sell aviation - not destroy it. The professional doesn't need a gift of gab to make a sale; his actions speak louder than many words. All of us can be professionals, but it takes a lot of special effort and hard work on a continuing basis. You need to prepare for and plan every flight. You need to practice on every flight. You need to read and study everything you can get your hands on that has to do with aviation. You need to know yourself and your aircraft and the capabilities and limitations of each. You need to know all the rules, regulations and procedures.

Hours do not necessarily make the professional. Whether your flying hours are counted in the hundreds or in the thousands makes no difference. You can be a professional if you try.

The professional pilot is a safe pilot and safety goes hand in hand with an efficient, productive aviation operation. Where do you fit in? Are you an airplane driver or are you a professional pilot? If you do not fall in the professional category, then you are a liability. Liabilities we can do without. Let's all be professionals in selling Army aviation and help maintain the high esteem which it now enjoys.

Eldred G. Bourne
Asst. Aviation Safety Officer
Atlanta Army Depot

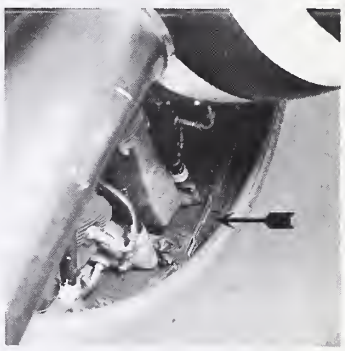
ZD PREFLIGHT INSPECTION

Joseph L. Bowler, Aviation Safety Officer
Letterkenny Army Depot

It started as a beautiful November day, in more ways than one, as I departed the depot for the airfield 22 miles distant. The boss was in a good mood, the aircraft was in perfect flying condition including the radios, I had what was considered a milk run for this part of the country (a flight to Ft Bragg, N.C., 02:45 hours), only 450 pounds of cargo and, for a change, the wind was directly down the runway.

I finished my Before Exterior Inspection and started on the Exterior Inspection, checking the nose, engine and engine cowlings. To the best of my knowledge, I completed the inspection without finding any discrepancies.

I proceeded through the remaining pilot's check list and was soon taxiing to take off and on my way. In exactly 02:45 hours, after a velvet smooth ride, I landed at my destination without incident. After discharging my cargo and refueling for the return trip, I took time out for a light lunch. Upon returning to my aircraft, I again began the usual Preflight Inspection Procedure. You can imagine my consternation and surprise when I looked down into the largest wrench (10") I had ever seen. (SEE PHOTO)



As I stood there staring in a state of shock, many questions came into my mind. How did I miss this on my previous inspection? What if I had flown through moderate turbulence and dislodged the wrench into the propeller? What about the perfect safety record I had maintained the past five years (2886 hours and 3,492,006 miles)? As Safety Officer was I becoming too complacent or over confident after flying this type of aircraft weekly for the past five years?

Arriving back at my home base that evening and not feeling the same exhilaration I had upon departing that morning, I had a serious talk with the crew chief. I learned he had replaced two bottom spark plugs and just as he finished, the phone rang. He laid the wrench inside the cowling as he hurried to answer the phone. By that time, I had arrived and started my preflight inspection with the preceding results.

Needless to say, I was very lucky this time but what about the next time? There will be no next time. An aviator must always be alert, attentive and thorough. There is no place in aviation for complaceny or over confidence. Flying demands 100 per cent ZD professionalism.

TRAINING AN INSPECTOR TO WORK SAFELY

Gerald E. Bolen
Assistant Area Supervisor, Quality Control
Hercules Incorporated
Radford Army Ammunition Plant

Radford Army Ammunition Plant manufactures high explosives (nitroglycerin and TNT), propellants (single base, double base, triple base and composites) and other chemicals such as oleum, sulfuric acid, nitric acids, etc. Quality Control inspection personnel perform receiving inspection of components and chemical ingredients, and in-process and final inspection on all propellant items manufactured.

During the recent period of production increases, Quality Control inspector trainees were selected and utilized as inspectors while undergoing on-the-job technical and safety training. The inspector trainees, as well as skilled inspectors, were assigned individually or in small groups to the various manufacturing areas on the plant. Because of the hazards of propellant manufacturing, the areas are widely dispersed. This made it necessary for the inspectors to work without the benefit of immediate Quality Control supervision and independent of manufacturing line supervision.

Since inspectors have to work in the actual manufacturing buildings observing the production operations, sampling the product, and making physical measurements on the propellants, the task of teaching the safety aspects of each operation in each building, for the many buildings and propellants manufactured, posed a significant training problem. Shifting production levels and the periodic need for intensified inspection upon one or more products also necessitated that the Quality Control inspectors be skilled in several different manufacturing areas. Quality Control Management was faced with the related problems of (1) expanding the Quality Control organization to meet the needs of increasing production, (2) bridging the problem created by inspector trainees working without benefit of immediate supervision, (3) training new personnel in the technical aspects of propellant manufacturing and in the use of measuring

instruments, and (4) obtaining reliable inspection data when 40 per cent of such data was generated by inspector trainees.

Personnel considered for Quality Control must have a high school education and must post a satisfactory score on an elementary intelligence test for selection as an inspector. The trainees are then provided preliminary training. This consists of a tour of the plant, a review of the plant safety rules, a brief introduction to Quality Control and its functions, and training in the use of gages basic to the process. Following the preliminary training the employee is briefed on Quality Control by three supervisors and assigned to a manufacturing area and shift. The shift foreman then commences indoctrination in all the published standing operating procedures that relate to sampling and inspecting of the trainee's assigned work area. The trainee must read, discuss, and exhibit to his foreman a thorough understanding of how to perform these inspection tasks prior to his introduction to the actual work area. He is next given a tour of his assigned work area by his foreman, and is assigned to work with an experienced inspector for further training purposes.

During the next six weeks the employee works in conjunction with this skilled inspector, though migrating through several operations to perform independent inspections. An important element of the inspector's safety training consists of an "Inspection Station Qualification Form" which cites the title of every standing operating procedure published by the manufacturing department relevant to the trainee's assignment. These procedures are intended for use by production personnel but are also used by Quality Control to train the inspector in the safety aspects of each propellant manufacturing operation. The trainee must tour each of the cited manufacturing operations and, by viewing the operation and studying the standing operating procedure, acquaint himself with the safety aspects of that operation. This phase of the employee's safety training significantly contributes to his understanding and respect for the operational safety practices of the manufacturing personnel, which he must also follow to avoid being the victim of an accident.

Concurrent with safety training is the employee's instruction in the technical aspects of becoming a component inspector. He must, by completing the review of all operations on his "Inspection Station Qualification Form", learn the proper practices employed by the manufacturing personnel at each of the many operations in his assigned work area. Adequate review is assured by requiring the trainee to exhibit to his supervisor a complete understanding of production flow and the mechanics of propellant manufacture. The trainee must also master a series of technical documents which establish the criteria for inspection, provide detailed instructions on sampling and sample handling, and provide for data recording and feedback. He must also become skilled in the use of measuring instruments, commencing with the more fundamental types such as the micrometer, calipers, and vernier scales and, as his training progresses, with more precise measuring instruments, such as concentricity gages, microscopes, contour projectors, analytical balances, and others.

The trainee's efforts are followed closely by his companion inspector who guides him safely through intricacies of his on-the-job training. Throughout the training period the employee is subjected to a series of brief, oral tests by his foreman, who follows his progress, aids him in his training, and provides special assistance where required. After serving the normal tour allocated for training in an assigned manufacturing area, the inspector is subjected to a detailed oral quiz by his supervisor. If he shows satisfactory proficiency in his job, he is subjected to a written examination dealing with the safety, measurement, sampling, and inspection aspects of his job assignment. If the written examination is successfully completed, the employee is assigned to another of the 19 inspection stations in Quality Control. He remains in a trainee status for a minimum of six months and until he satisfactorily masters four work assignments.

The inspector has learned the rudiments of the manufacturing process, mastered the use of measuring instruments, learned the techniques of sampling, coped with the technical documentation, and learned to perform his tasks safely while working and training independent of

immediate Quality Control supervision or specifically assigned training personnel.

The willingness, dedication, and safety consciousness of the inspection personnel have extended the safety record of Quality Control beyond 13 years and 2.5 million man-hours without a lost time injury. This represents a significant contribution to the enviable safety record compiled at Radford Army Ammunition Plant.

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REFERENCE PUBLICATIONS

1. AMCR 11-16, 10 February 1969.

   Army Programs, AMC Program System Master Planning Objectives.

2. AMCR 385-8, 17 February 1969.

   Safety, Safety Promotional Material.

3. AMCR 385-10, 10 March 1969.

   Safety, Safety Training in Civilian Institutions.

4. AMCR 385-16, 12 March 1969.

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5. AMCR 385-21, 11 February 1969.

   Safety, Determination of Ammunition and Explosives Characteristics that Influence Handling, Storage, and Transportation Criteria.

6. AMCR 385-3, 20 February 1969.

   Safety, Reports of Explosions, CB Agent Releases, Radiation Incidents, Serious Accidents, and Nuclear Incidents at AMC Installations and Activities.

(Continued on page 23)

"I DIDN'T WANT TO GO"

Major Johnson stood in the ankle deep snow looking with complete disgust at the crumpled U-6 strung out in front of him. The northeast wind blowing in over him had chilled him so that he was beyond just feeling uncomfortable, he was cold. Here he was, the president of an aircraft accident investigation board, TDY until accomplished. "I wonder what Mary and the kids are doing right now", he thought to himself, only making the cold weather harder to live with. "May as well get this damn thing started or I'll never get home."

The investigation went like this: The mission was originally called in as, "transport chemical munitions from Edgewood Arsenal to Morristown Municipal. Size of container is four feet by four feet by two feet and weighs fifty-two pounds". Colonel Larsen got the telephonic mission request and wrote a memo for his operations officer and took off on a long overdue two day VOCO. The operations officer found the memo and called CPT Smith at home. It was 1730 hours before he had located him and the take off time was 0700 hours the following morning. CPT Smith had plans for attending a civilian employer counseling session so he started calling CW2 Cantrell to take the mission for him. At 2315 hours he made telephonic contact and passed on the mission, "Take a box from Edgewood to Morristown and be sure a gas mask is on board".

CW2 Cantrell took off at 0700 hours and had CPT Smith's M24 gas mask with him in the co-pilot's seat. Two hours later at Edgewood he watched through the window while a cardboard box was loaded into the rear of the U-6A. The coffee he was sipping was horrible but at least is was hot. Weather said another "high" was moving in and turbulence could be expected up to 16,000 feet but he knew that the weather man was never right. Approximately forty-five minutes later, CW2 Cantrell and U-6A 53285 lay splattered all over the side of a hill, line short of Solberg VOR.

The accident investigation board was named, one from St. Louis, one from Dugway, and one from Morristown and "look who showed up to freeze to death, naturally", thought Major Johnson. It was a full 30-hours since the crash but the cold weather had preserved everything until he had arrived.

Reconstructing and guessing told this story: "The aircraft had hit turbulence crossing the Delaware River and the unsecured box in the rear of the U-6 had overturned setting off several gas grenades. The cockpit filled with gas, and the pilot, unfamiliar with putting on a gas mask in flight, attempted to get it into place on his face. The lip microphone had not been tested so his calls for help were all in vain. The crash probably occurred during the pilot's peak of panic inside the cockpit."

The facts and personnel in this story are all figments of the author's imagination but the inferences to possible situations are too close for comfort.

(Editor's Note: Although this story is a figment of the author's imagination, aircraft accident records reveal that a mishap closely paralleling the events described above actually occurred, resulting in the loss of several lives and an aircraft. The point of the story is well taken and reflects the intent of the guidance set forth in paragraph 15, AMCR 385-26. AMCR 385-26 is being revised to require wearing of a protective mask at all times when fuzed items with incapacitating or toxic chemicals are carried inside aircraft. The M-24 protective mask is available for use and is compatible with communication systems in Army aircraft.)

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(Continued from page 21)

7. AMCR 385-2, 13 March 1969.

Safety, Accident Reporting - Routing of Required Reports.

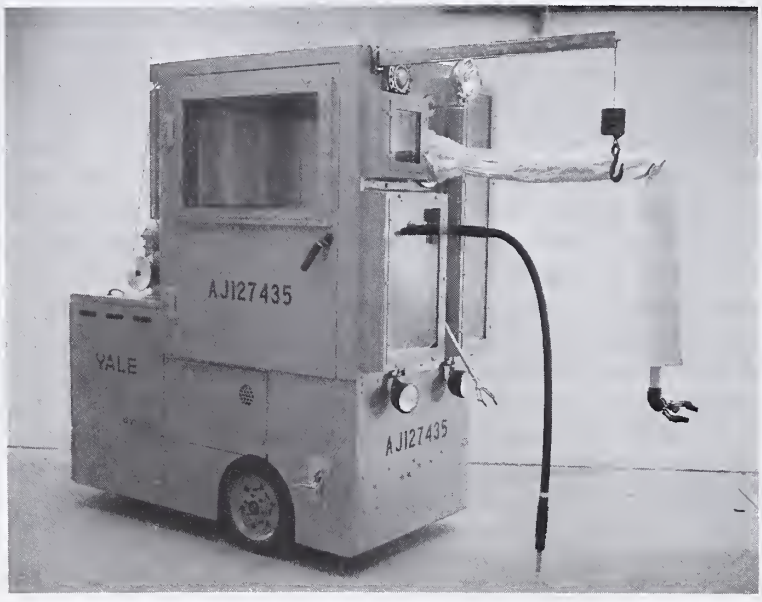
8. AR 385-40, Change 4, 7 March 1969.

Safety, Accident Reporting and Records.

PICATINNY ARSENAL BUILDS MECHANICAL DUD RETRIEVER

How can you cope with the hazards that may be encountered when it is necessary to retrieve ammunition "duds"?

Picatinny Arsenal uses an in-plant dud retriever designed by Charles Okum, an engineer in the Malfunction Analysis Unit of its Ammunition Engineering Directorate. The machine is shown in the photo below.



The cab armor is constructed of three laminations of one-fourth-inch mild steel plate. The viewing area consists of laminated clear polycarbonate and safety glass with air gaps totaling four inches thickness. This equipment is designed to withstand the explosive force of ammunition equivalent to a 6-ounce charge of Composition B. The equipment was tested against the effects of a fragmentation grenade, to simulate the worst condition of an explosion in close contact with the vehicle.

The cab and its dud handling mechanical arms are mounted on a special electric truck chasis that was supplied by Eaton Yale and Towne Co.

When a dud exists at an outdoor test area, another retriever (outdoor type) picks up the item and places it in a transporter which is towed by a truck to

a disassembly building. The new in-plant retriever is driven out to the transporter and with one of its mechanical arms picks up the dud and delivers it into the building where it can be disassembled to discover why it malfunctioned.

Because of its smallness (36 inches wide, 70 inches long and 79 inches high) the new retriever can enter any of the buildings in the ammunition loading area and remove a questionable munition item.

The in-plant retriever is primarily intended for use indoors and on hard surface areas and is highly maneuverable in close quarters. It is used daily throughout the Arsenal's loading and testing facilities. It reduces long shut-down of lines where suspect ammunition is encountered. It is so versatile and useful that two more units are in the process of being built. The large articulated mechanical manipulator is capable of performing highly dextrous operations duplicating all movements of the human hands including the capping of containers or the mating of screw threads. In addition, the straight arm manipulators have high-low reach capabilities while the retractable power boom can handle up to 200 pounds of weight.

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LEVIN NAMED TO NEW NSC SECTION

Sidney Levin, Chief of Industrial Health and Safety at the Army Materials and Mechanics Research Center, Watertown, Massachusetts, recently became a charter member of the National Safety Council Industrial Conference's new Research and Development Section. He has been appointed to serve on the Executive Committee in the area of Standards and Special Projects.

All the objectives of the Research and Development Section are directed toward improved safety in the laboratory and pilot plant. To meet these objectives the Section will (1) investigate, analyze and define hazards in research and development organizations; (2) serve as a focal point in exchange of information on safety; (3) promote safety education in the academic environment and help develop safety attitudes and basic understanding of safety principles in the research environment; (4) study accident trends in research and development organizations; and (5) improve the flow of safety information between the safety engineer and the scientist in the laboratory, pilot plant or testing facility.

FREAK BLAST GIVES FURNACE HAZARD WARNING

E. W. Wolfe, Safety Officer
Scranton Army Ammunition Plant

Several years ago a maintenance worker at the Scranton Army Ammunition Plant, in the course of his early morning duties, lighted the pilot burners of a gas-fired rotary hearth furnace. This was used to heat copper rotating bands prior to application and seating of the bands on 8-inch and 175mm projectiles by band seating presses.

The maintenance worker assured himself that the pilot burners were lighted and walked a short distance to another task. He had scarcely left the immediate area of the furnace when a loud noise and shock wave shook the furnace and adjacent parts of the building.

It was found that the furnace had imploded. This freak incident caused the furnace roof and fire brick walls to fall on the hearth rather than be blown outward, because an inverted action took place. Fortunately no one was hurt.

Investigation and analysis by contractor and government representatives revealed that the cause of furnace damage was ignition of an excessive static accumulation of gas plus operating pressure from open valves on gas line burners. It was also determined that a "normal" type of explosion, blowing the furnace roof off and rupturing the sides of the furnace, might occur if excessive gas accumulations should be ignited in the burner area. Injury to employees and damage could take place if this happened.

Corrective action to eliminate this hazard in preheating the furnace was taken by adding an air purging system to the furnace. (See photo.) The air purging system consisted of:

Solenoid gas mixing valve
Cartridge type fuse
Forty feet white wire
(TW 12)

The air purging system added a safety factor to the furnace operation in that it prevents admission of operating gas into the pilot burners for five minutes. This action allows time to clear the oven of static gas accumulations and permits normal pilot burner and main burner operation prior to preheating of the furnace hearth for production requirements.

One Scarf Ruined

A female Army employee operated a speed lathe to clean rust and scale from combustion chamber drain valve bodies. She sat at a workbench where she could hold the valve bodies against a 4-inch wire brush that was mounted on a 7-inch shaft. The brush operated at 1750 revolutions per minute.

The worker was wearing safety glasses but no safety face shield. She was also wearing a nylon scarf knotted around her neck. Late in her work shift, when she reached across the machine for a control lever, a loose end of the scarf touched the wire brush. The wire bristles caught the cloth and began to wrap it around the shaft. The woman was pulled head first against the machine guard of the rotating chuck.

Another employee saw the woman's predicament and came to her aid. The machine was shut off, the scarf was cut away and help was called. An ambulance came and moved the woman to the dispensary.

Bruises and abrasions in the area of her head, eyes and shoulders caused her to miss two days from work.

Actions taken to prevent similar accidents included the following:

⊛ 1. A more intensive program was initiated to train workers not to wear loose clothing that might be caught by moving machine parts.

⊛ 2. Supervisors were instructed to intensify their monitoring of personnel compliance with operating safety rules.

⊛ 3. The adequacy of equipment guards was examined and action was taken to install guards wherever needed.

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He Landed in the Kettle

Two contractor employees were cleaning the duct work of an exhaust vent system above the TNT melters at an explosives manufacturing plant. Their work involved taking down and reinstalling aluminum sections of the system.

To get one section back into place one of the workers climbed upon the top of a melt kettle. He stood on the kettle lid and the second worker handed the section of duct up to him. He then reached up to proceed with the connection.

The man's movement caused the kettle lid to slip. Once it was no longer securely supported, it turned beneath him and dropped him feet first into the kettle's content of moltent TNT. His left leg went down almost to the knee in the hot explosive. His right leg also went into the liquid, but not quite so deeply.

The worker kept himself erect and managed to jump out of the hot explosive. He landed on the floor. His companion promptly applied cold water from a nearby water hose. The burned man was soon taken to the plant medical department and then to a public hospital. The burns on his legs were so severe that he was away from work for about three weeks.

The following activities were taken to prevent similar accidents:

● 1. Upon his return to work the injured employee was reprimanded and information on his substandard work procedure was placed in his personnel file.

● 2. The employee was given fresh instructions against climbing on or above equipment while replacing duct work.

● 3. The accident and the lesson it taught were discussed in plant safety meetings.

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They Fell Like Dominoes

Stacks of crated dispensers with bomb units were being moved from a work apron to a shipping dock. The dimensions of the individual crates, with their skids, were 94 3/4" X 25 1/2" X 22 3/5". For shipping purposes four of these crates were banded together. The overall height of the skidded, banded, four-crate unit, as it stood on the apron, was 101 1/2". It weighed 3,600 pounds.

Five four-crate units had been made ready for shipment and these stood in a line with the individual units about three feet apart. An Army employee was at work between stacks five and six, preparing number six for banding.

The operator of a 4,000-pound forklift was to move the crated items to the shipping dock. He approached the end of the line with his machine and tried to lift the first one. The 3,600-pound load came part way up and then tipped forward against stack two. The reaction resembled that of a domino on edge struck by its neighbor. The unit tipped over against the next in the line. One by one the domino-like tipping reaction moved down the line through stack six.

When stack five tipped against stack six, the worker banding number six was caught. He received a scalp laceration and concussion and was expected to be away from work for 30 days.

The stacking procedure was changed to reduce the tipping hazard. The four-crate units were stacked on the sides rather than on the ends of the crates. The resulting stacks were less than half as high as those that had tipped over domino fashion.

Volunteer Overlooks Stacking Hazards

■ The picture above shows what may follow when these two accident and injury producing factors are brought together:

■ 1. An untrained operator operated materials handling equipment.

■ 2. A forklift was used without an overhead guard.

Two storage operators were unloading a tractor-trailer load of palletized shells. One was an experienced, licensed forklift operator. The second was not a licensed operator and it was not intended that he operate a machine. His job was to work as a helper and to assist with dock plates and portable lighting equipment.

There were two electric forklifts at the worksite. The licensed operator used one to unload 12 pallets of shells from the truck. He placed them temporarily in an empty area of the magazine in which they were to be stacked. When the trailer had been unloaded he turned to the nearby area where the shells were to be stored.

An unexpected sight met his eyes. The second worker, who had no instruction to do the work or authority to operate the forklift, was attempting to stack the pallets. The forks would not reach high enough to stack a single pallet on a stack of three. The worker used the machine to lift two at one time and tried to place these on top of the two already in place. The weight was within the lifting capability of the 4,000-pound capacity truck.

The photograph shows what happened. The unlicensed operator failed to raise the forks high enough to clear the top of the stacked pallets. Contact was made with the top of the stack. This caused the pallets on the fork to tilt toward the rear. This motion, plus a slight backward tilt of the forklift mast, caused the top pallet to slide to the rear. It fell first on the operator and steering column and then to the floor as shown in the picture.

The worker, who was 20 years old, received fractures and compression injuries that involved his back, chest, lungs, ribs and sternum. It was thought these might result in permanent handicaps that might never permit him to work again.

The first worker, who was authorized to operate the equipment, was not aware that the second worker was attempting to stack the pallets until seconds before the accident occurred.

The installation took the following corrective action:

- 1. A formal forklift operator's training program was started to train all new forklift operators and to retrain those individuals who already held operators licenses.

- 2. All supervisors who used forklifts in their operations were reinstructed on the necessity for using the proper type of materials handing equipment for individual jobs.

- 3. A study was made as to the availability of forklifts better suited to the particular needs of the installation. Particular attention was given to the matter of overhead guarding.

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Broken Light Bulb Was Costly

A forklift operator was busy moving a pallet of illuminant candles from the doorway of a press building

to a service storage building. The pallet contained 12 tote boxes of the candles. The worker had nearly seven months experience in moving hazardous materials through these doors, and he was complying with the contractor's standing operating procedure.

While the operator was busy getting the machine into position and lifting the pallet, the upper part of the forklift mast struck and broke an overhead electric light outside the doorway. Hot fragments of the bulb fell into an uncovered box of the illuminant candles. The hot glass ignited the illuminant. The fire quickly became intense, and it spread to the other tote boxes on the pallet and to other materials in the building. Soon the building was burning.

Before it was extinguished the fire spread down a ramp and involved other buildings used in the illuminant manufacturing operation. Total estimated damages to buildings, equipment, tooling and materials in process were almost $900,000.

The forklift operator escaped with first-aid injuries.

Management, safety and fire protection personnel at the installation took a hard look at the lighting and fire protection systems. The overhead outside lights, centered 12 inches above the doorways, were turned off until they could be moved to safer locations. Work had been started to install a sprinkler system, and this installation was continued in other pyrotechnic areas. It was also intended to take other needed corrective actions that might be revealed by an investigation of the fire.

ROAD ROLLER OVERTURNS, KILLING OPERATOR

An AEC road paving contractor employee was fatally injured while operating a rubber tired roller on a road shoulder when the roller ran off the road, down an embankment and overturned, crushing him to death.

During the investigation, it was concluded, from the statements of witnesses, that the deceased had apparently dozed; however, that he was awakened when the roller started down the embankment, and, that as he attempted to jump off the machine, he fell in front of it.

Recommended Preventive Measures

1. Establish procedures to assure that employees are physically capable of performing their duties when they report to work.

2. Re-educate employees regarding the need for full alertness and attention to the duties at hand.

NOTE: The Corps of Engineers, U. S. Army, Manual, "General Safety Requirements", EM 385-1-1, is a standard prescribed in AEC chapter 0550, "Operational Safety Standards". The March 1967 revision in Section XVIII, "Machinery and Mechanical Equipment", part 18.A.20 requires:

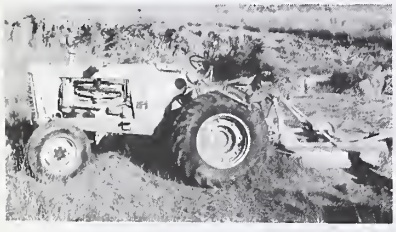
"Crawlers and rubber tired tractors, self-propelled pneumatic tired earth movers, water tank trucks, and similar equipment shall be equipped with steel canopies and seat belts for the protection of operators from hazards of rollover. (Level, smooth and firm terrain does not present a rollover hazard.) This protection shall be in addition to provisions of 18.A.18 and 18.A.19. Canopy and supporting attachments shall be designed, fabricated, and attached to the frame in a manner to support not less than two times the weight of the prime mover, based on the ultimate strength of the metal and integrated loading of supporting members with the resultant load applied at the point of impact. The design objective shall be to prevent crushing of operators during rollover. There shall be a vertical clearance of 52 inches from the deck to the canopy where the operator enters or leaves the seat."

Rollover protection systems (ROPS) for use on many different types of such equipment are commercially

available from equipment manufacturers and specialty companies (one has over 500 ROPS designs available and is developing more) or such systems may be designed, constructed, and installed locally where engineering talent is available.

- Serious Accidents, Issue No. 296
Division of Operational Safety
U.S. Atomic Energy Commission
Washington,D.C. 20545

(Editor's Note: During good weather months the Army makes increased use of its heavy earth-moving, roads, maintenance and grounds equipment. The photographs below are published as a reminder of what may happen if unsafe usage is permitted.)



The driver of this Army-owned tractor lost control when its transmission slipped out of gear. The machine, moving down a grade, reached an estimated speed of 20 miles per hour. It ran off the road, rolled completely over and stopped in the position shown in Photo 1. The driver was killed.

An empty turnapull was making a left turn of about 20°. It rolled backward about 25 yards in a semi-circular direction on 25° slope. It overturned, as shown in Photo 2 and the operator was killed.

At an Army installation an operator lost control of a road roller he was driving down a long and fairly steep grade. He jumped off when the machine started over the road shoulder and down a steep bank. His injuries included fractures of his left ankle and right knee.

PLANNED APPROACH YIELDS SAFETY RESULTS

Ben T. Stephens, Safety Director and Paul E. Closuit,*
Safety Officer
Pueblo Army Depot

It is profitable to look behind you occasionally. You may recognize mistakes and shortcomings and take action to change your ways for the better. You may also recognize procedures that have produced an efficient program. Either may be worth sharing with your colleagues.

Here are some of the leading points, all fundamental to the success of an installation safety program, we have identified through review of the Pueblo Army Depot program and experience:

1. Top management support is vital to the effectiveness of a safety program. Our Commanding Officer and directorate-level chiefs have made it crystal clear to all levels of supervision that they support the safety program. They hold each subordinate supervisor accountable for the success of the safety program in his area of responsibility.

2. Management support of the safety program has been formally established in writing. This has been done through the medium of a Commander's policy letter on safety. This support continues to be brought to the attention of all personnel through articles in each issue of the plant newspaper.

3. Safety program success is achieved through the efforts put forth by supervisors at all levels. They are the individuals who must train and supervise the individual workers to develop and practice safe working habits. The good will and support of the supervisors are essential for a successful safety program.

4. The safety program is planned well in advance of execution. There must be an established plan if a goal is to be reached.

*Since this article was written, Mr. Closuit has left Pueblo Army Depot to accept a more responsible position in the Army safety career field. He was a member of the FY 1967 Safety Career Management Intern Training Class at the AMC Field Safety Agency.

5. Committee activities are scheduled and coordinated and are held on time. Meetings are kept interesting and are well attended.

6. A master inspection schedule is prepared, planned ahead of execution and accomplished on schedule. Thorough inspections are accomplished, with cooperation as a keynote.

7. Investigations are thorough. We involve other people in them, and we learn from them. Occasions for investigations are recognized and treated as opportunities to work together in the interest of progress and safety.

8. Promotional efforts are planned. The material is ordered ahead of special needs and is distributed on a regular and timely schedule. Here also support is received from the plant newspaper.

9. Safety personnel maintain close, friendly relations with the employees. They can work effectively with the employees to achieve safety objectives, because they know their capabilities, ideas and philosophies.

10. We have a clear concept of our approach to safety and we follow it. Here are some of the ideas and principles we use.

a. The safety man should function both as an advisor on safety matters and as a "stimulator" of safety. He cannot interfere with or usurp the functions of the supervisors, but he must work closely with them.

b. The ability of the safety man to explain the safe procedure and gain the confidence and respect of every foreman, supervisor and director enhances the effectiveness of the safety program.

c. The safety man must realize that his is a service job. He must not encroach upon the authority of the various members of the supervisory force.

d. He must limit the use of the negative approach to those situations which require absolute prohibitions. He must put the emphasis on what to do rather than on what not to do.

e. He knows that fear and punitive measures are poor whips. They may be effective at times,

but their ultimate result is usually bad.

To develop a high level of safety performance and maintain it steadily is very difficult. Safety programs, to be effective, must be planned and carried out in the light of this fact. Stimulation of safety interest, development of interdepartmental cooperation and coordination, and a helpful, understanding attitude when "selling" safety have all helped balance our safety program into an effective one.

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EYE PROTECTION SCORES AGAIN

Why do we need safety glasses? George Harrison, Apprentice Toolmaker at Picatinny Arsenal, can answer this question with deep conviction. He was operating a 14-inch engine lathe in the process of drilling a hole in a tool steel bushing, and the machine was shut off to prepare for the final deburring operation. As he reached to pick up a file and simultaneously restart the lathe, a flying object, believed to be a heavy piece of metal chip from machining, was hurled by the rotation of the lathe chuck. It struck the left lens of his safety glasses. The impact of the striking metal shattered the lens, but his eye remained unharmed. George says, "Without the protection of the safety lens, my eye would have been knocked out."

Events Leading up to the Exposure

A cobalt 60 source of approximately 10 curies was ordered by an AEC contractor, the order specifying that it was to be a slug encapsulated within a magnetic carrier capsule, which was to be sealed either by being silver brazed or heliarc welded.

When the 10-curie source was received, a 300-curie source, previously ordered, was found to be in the same shipping container. The shipping papers included a leak-test certificate for the 300-curie source but no such certificate for the 10-curie source. As the sources were not needed until a later date, they were kept in the shipping container for about two weeks. The 300-curie source was then removed and transferred to a hydraulically-operated calibration system. A week later, the 10-curie source was transferred to a storage container. When a routine survey revealed that the shipping container was contaminated with cobalt 60 and cesium 137, it was decontaminated to nonsmearable status, tagged as being internally contaminated, and returned to the vendor.

Because the shipping container was internally contaminated, it was assumed that the source capsules might be also. The 300-curie source capsule was found to have negligible contamination; however, the 10-curie source capsule was found to have heavy cobalt contamination. It was assumed that this was external contamination and, therefore, the capsule could be readily decontaminated.

The Exposure

Two monitors were assigned to decontaminate the 10-curie source capsule, after consultation with the Lead Monitor as to the procedure and tools to be used. The Lead Monitor instructed and cautioned the two men to use remote-handling tools.

While cleaning the source capsule in acetone, with remote-handling tools as instructed, it was noted that the capsule cap appeared to be loose. At this point,

Monitor A telephoned the Lead Monitor to report the apparent condition of the cap, and to find out more about the physical description of the source. The Lead Monitor checked the capsule specifications (see first paragraph above) with his supervisor and, both assuming a double encapsulation, the Lead Monitor instructed the two men (by telephone) to remove the inner sealed source and decontaminate the outer capsule. Again, the monitors were reminded to use remote-handling tools. Nevertheless, Monitor A, finding the tweezers with which he tried to hold the capsule were inadequate, picked the capsule up with his left hand (with his body shielded by a lead barricade), unscrewed the cap, dumped the contents out on the bench top behind the lead barrier, and stepped back out of the work area with the empty capsule. During this procedure, the monitors discovered that the capsule had contained eleven pellets rather than a single sealed source.

The men again contacted the Lead Monitor by telephone and were instructed by him to reload the cobalt pellets into the capsule and ship the capsule back to the vendor. Once more, they were cautioned to use remote-handling tools.

In planning the work to be done, the monitors decided that Monitor B would put the pellets back into the capsule and Monitor A would close up the capsule and put it into the storage container. They also decided that it would be quicker to use their hands than the remote-handling tools, thereby reducing their exposure to the source. They also felt that the remote-handling tools were not satisfactory for such a delicate job and that there was the possibility of crushing the small pellets and spreading the cobalt contamination throughout the area or perhaps dropping a pellet and getting further exposure trying to recover it.

Monitor B took the capsule and screw cap and, at arm's length, in two attempts, replaced the pellets into the capsule. This was done by reaching behind the lead barricade. He then stepped back and Monitor A took over by picking up the capsule in his left hand, screwing the cap back on with his right hand, and then dropping the reassembled capsule into the sleeve. Using tongs, he put the sleeve into the storage container and covered the storage container with lead bricks.

At no time during all of the procedure did the Lead Monitor or his supervisor appear at the source storage area where the work was going on to assess the situation personally. All instructions were given to the monitors by telephone. On their part, the monitors did not inform the Lead Monitor of their decisions not to use remote-handling tools. When their personnel monitoring devices (film badges and thermoluminescent finger dosimeters) were read, it was found that both monitors had received hand radiation exposures, estimated to be:

Monitor A - 655 rem$^{+}_{-}$ 45% left hand - 54 rem right hand.

Monitor B - 23 rem left hand - 10 rem right hand.

The two men were not wearing self-reading dosimeters.

Conclusions

1. Fabrication and encapsulation specifications were not followed.

2. Shipment was made in a contaminated container.

3. At the time of the receipt of the shipment, the sources were not checked to determine if they met encapsulation specifications.

4. At the time of the receipt of the shipment, an inspection for damage, leakage, or inoperability was not made, as required by the contractor's written procedures.

5. Self-reading dosimeters were not worn by the monitors, as required by the contractor's written procedures where a potential external exposure greater than 50 milliram may occur.

6. Instructions were not followed fully to use remote-handling tools.

7. The operation was not supervised personnally (only by telephone), although it became obvious that it was no longer routine.

Recommendations

The recommendations in this incident are glaringly obvious from the conclusions drawn; therefore, it does not seem necessary to enumerate them here. Knowledge of the circumstances resulting in this exposure should prove of assistance to others in planning procedures to avoid similar incidents in their own operations.

(Editor's Note: Division of Operational Safety, U. S. Atomic Energy Commission, has furnished information concerning a radiation exposure such as might occur within the U. S. Army or at an Army contractor facility. A few years ago the Army experienced an overexposure because of similar failure to assure that the source complied with the specification requirements, and because of poor planning)

[redacted]--Serious Accidents, Issue No. 297
Division of Operational Safety
U.S. Atomic Energy Commission
Washington, D.C. 20545

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NATIONAL SAFETY COUNCIL AWARD WINNERS

Red River Army Depot has been informed that they have qualified for a NSC Award of Honor for operating 7,101,038 man-hours without a disabling injury from 17 May 1968 to 21 November 1968.

Sacramento Army Depot has been advised that they will receive the NSC Award of Honor for operating 3,087,330 man-hours without a disabling injury from 23 August 1968 to 14 January 1969.

Explosives Safety

A HAZARD REMOVED FROM POWDER EXTRUSION OPERATION

R. E. Johnson, Safety Services Superintendent
Olin Mathieson Chemical Corporation
Badger Army Ammunition Plant

Analysis of the operation of vertical block presses in the smokeless powder extrusion process by Olin Mathieson Chemical Corporation employees at Badger Army Ammunition Plant highlighted a hazard that had existed for years.

To remove a screen and a powder heel at the end of each cycle, it is necessary for the press operator to move his body between the ram and the chamber of the press. Ram movement is slow and a warning bell sounds at the start of ram movement, but this is not a true guard. Bells on adjacent presses ring each cycle and can cause confusion. It was possible for a passerby to inadvertently move the operating lever, or for the operator to move the lever with his foot when he was in position to pull the screen and powder heel.

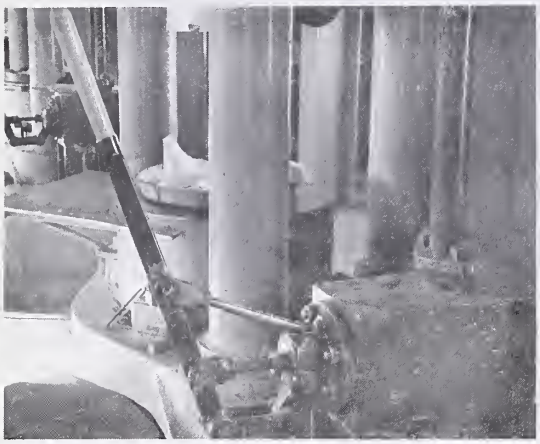
A maintenance employee, Mr. Dale Kunce, overheard discussions of the problem. On his own initiative he designed a prototype guard in the form of a safety lever. This device was subjected to an engineering review, was accepted, and is being installed on all manually operated vertical block presses.

The accompanying photos show the simplicity and practicality of the safety lever. Photo 1 shows the ram's operating lever in the "Off" position and the safety laver in place. If the operating lever is pushed toward the "On" position, the movement is quickly brought to a stop. Before the ram lever can be moved to the "On"

position, the safety lever must be lifted, as shown in Photo 2. In Photo 3 the control lever has been moved to the "On" position and the ram operating cycle can proceed.

The sketch shows the simple construction and installation of the safety lever.

1



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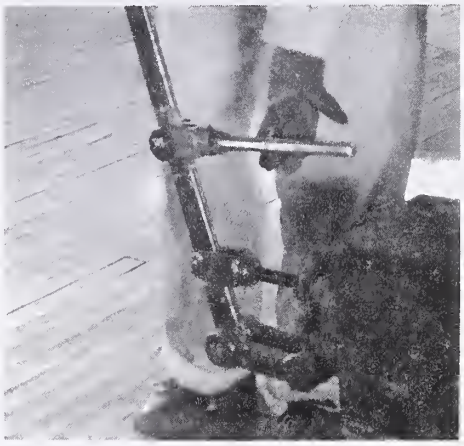

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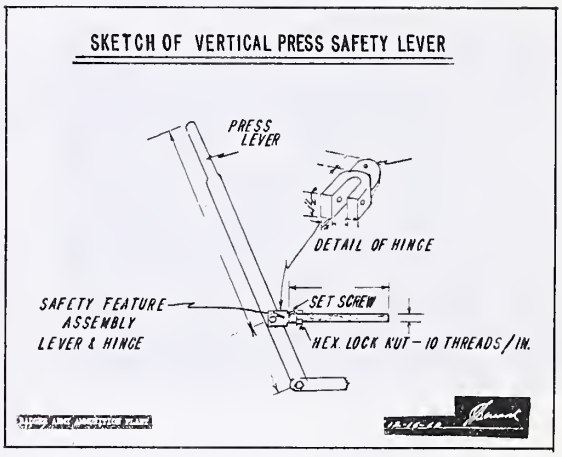
SKETCH OF VERTICAL PRESS SAFETY LEVER
PRESS LEVER
DETAIL OF HINGE
SAFETY FEATURE ASSEMBLY LEVER & HINGE
SET SCREW
HEX. LOCK NUT - 10 THREADS/IN.

The guard developed by Mr. Kunce has the merits of acceptability, and low cost and maintenance. It requires a separate but easy movement by the operator before the ram operating lever can be moved. The guard is so easy to operate that there is little temptation for an employee to block it out. It is effective.

One moral derived from this occurrence is that time does not eliminate hazards. Direct action by interested people is necessary.

MG IZENOUR, CG, TECOM, PRESENTS AMC AWARD OF HONOR TO JEFFERSON PROVING GROUND

Jefferson Proving Ground won the Army Materiel Command Award of Honor for Safety for its outstanding FY 1968 safety program. MG Frank M. Izenour, Commanding General, U.S. Army Test and Evaluation Command is shown presenting the award to Mr. George C. Thurston, Safety Director, Jefferson Proving Ground. This is the second AMC Award of Honor achieved by this USATECOM installation since the establishment of the U.S. Army Materiel Command.

ABERDEEN PROVING GROUND RECEIVES AMC AWARD OF MERIT

Major General Frank M. Izenour, Commanding General, U.S. Army Test and Evaluation Command (second from left), presented an AMC Award of Merit to Colonel George C. Clowes, Commanding Officer, Aberdeen Proving Ground, during ceremonies at the proving ground. This award was made for superior achievement in the field of safety during FY 68. Mr. Roger J. Lerwill, Director for Safety, USATECOM (left), and Mr. Charles P. Treppe, Director for Safety, APG (right), looked on as the award was presented.

U.S. ARMY ARTILLERY BOARD RECEIVES AMC AWARD OF MERIT

Major General Frank M. Izenour (right), Commanding General, U.S. Army Test and Evaluation Command, is shown presenting the U.S. Army Materiel Command Award of Merit to Colonel Paul S. Cullen, President, U.S. Army Artillery Board. This achievement represents superior efforts in safety functions for FY 1968.

DIVISION RECORD HONORED AT SACRAMENTO ARMY DEPOT

The Sacramento Army Depot gives formal recognition for outstanding safety records achieved by its major subordinate elements. In the photo at right Colonel Arnold A. Berglund, Commanding Officer, is shown presenting the Commander's Safety Performance Trophy to Mr. Benito Gomez, Safety Coordinator of the Processing and Assembly Division. The sign in the background credits the division with 1,617,736 productive man-hours without a disabling injury.

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SAFETY SHOE PREVENTS DISABLING INJURY

Mike Borich (center), an employee in the Tooele Army Depot Ammunition Equipment Office, is shown receiving the congratulations of COL Jack C. Ice, Deputy Commanding Officer, for his election to membership in the Scarab Club. Members of the club are individuals who have been saved from crippling injuries or possible death by conscientiously wearing safety equipment on the job. A 350-pound weight fell on Mr. Borich's foot. His supervisor, John D. McNeill, holds the safety shoe which prevented a crippling foot injury.

PERSONALIZED SAFETY

Jody D. Meredith, Safety Officer*
Sacramento Army Depot

Before a safety program can be a success, the personnel who are directly affected by it have to accept it as an important part of the status quo.

Those who plan it should take into consideration just how best to involve the safety program to the mainstream of the installation's activities. They are successful if the program they create would leave a recognizable void if it suddenly disappeared.

A successful method of reaching the workers is to secure their individual identification with the safety program. They should be made to see how it effects them. Every accident investigation can unfold a tale which, presented properly, can stimulate the imagination and have a lasting influence. However, this benefit may not be realized if it is not presented to those who can profit from it.

Some installations make good use of such media as a scoreboard which is conspicuously displayed to inform workers daily of accidents. Other installations fly a green cross for safety flag when all is well. Everyone is aware an accident has occurred when a black flag is flown in place of the safety flag. In each instance it becomes a matter of curiosity to discover what has happened to cause the disruption.

Much can be gained by use of the installation bulletin boards and newspaper. Pictures and stories on local happenings are more effective than those about far-off events.

At Sacramento Army Depot the installation newspaper staff works hand-in-hand with the Safety Office to give wide coverage to occurrences that involve safety and the entire safety program. Recognition of the worker from his fellow employees for a job well done is its own reward.

Use has also been made of the Industrial Supervisor, a monthly publication of the National Safety Council.

*Mr. Meredith was a member of the FY 1968 Safety Management Intern Training Class at the AMC Field Safety Agency.

Because this publication is circulated throughout the entire facility, a flyer with additional information is stapled inside the front page of the magazine. This provides a good method for getting additional information to the supervisory group. Supervisors' responses to the flyers have been encouraging.

When Sacramento Army Depot installed its driverless tractor system, a leaflet warning of the hazards with pictures and routes was given to each worker as he entered the installation. This was found to be the quickest and most direct method of informing employees.

It is important that a variety of methods be used to reach the worker. The impression should not be created that safety is being forced on the worker. It should be shown that he cannot work without it.

An effort must be made by Safety Office personnel to maintain a favorable image so that workers will think of the Safety Officer as an essential part of the program but not as policemen. The "gig" should be eliminated from association with safety inspections. The worker and supervisor must realize the importance of each item written into a report. It is most important to omit writing something into a report just to show that an inspection has been made. If there are no discrepancies, it should be so noted.

A frequent reminder to make every task safe does not cost nearly as much as the cost of the loss of the employee or of Army materiel. The likelihood of having to prepare reports is greatly reduced when the individual employees reach the stage where they always consciously strive to perform safely.

WEAPONS COMMAND WINS AMC AWARD OF HONOR

The Weapons Command was the 1968 winner of the AMC Award of Honor for Safety. In the picture at right Major General O. E. Hurlbut, Commanding General, WECOM, hands the award plaque to James R. Sampson, WECOM Safety Director. Since 1963 WECOM has received five of the six Awards of Honor made by AMC to its major commands. The one year WECOM did not win the highest award, it received the second highest, an Award of Merit.

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WHITE SANDS MISSILE RANGE RECEIVES AMC AWARD OF MERIT

White Sands Missile Range received an AMC Award of Merit for Safety for its superior safety program during FY 1968. The photo shows MG H. G. Davisson (left), Commanding General, White Sands Missile Range, receiving the award from BG Michael Paulick, Deputy Commanding General, U. S. Army Test and Evaluation Command. Mr. A. J. Crouse, White Sands Missile Range Safety Director is shown in the center.

Here are ten questions that will test your knowledge of safety requirements that you will need under different circumstances. The answers to all of them may be found in AMCR 385-224. How many can you answer without referring to the regulation? The correct answers and references appear on pages 55 and 56.

1. If an explosion in one building of an operating line causes severe structural damage to the next building, does this prove that an incorrect intraline distance was established?

   Answer and reference:

2. What is the minimum distance permitted between the underground storage of gasoline and the nearest explosives or ammunition handling facilities?

   Answer and reference:

3. What is the maximum rate of feed that is allowed for machining high explosives?

   Answer and reference:

4. What general rule guides the determination of speeds to be used when explosive items are machined?

   Answer and reference:

5. What time should elapse before a burning of explosives may be repeated on the same burning ground plot?

   Answer and reference:

6. What are the two agencies whose approvals of respiratory protective devices are acceptable to the Army?

   Answer and reference:

7. What general policy governs the use of wooden materials in a building where acid is to be stored, handled or used?

   Answer and reference:

8. Can you name four engineering methods that may be used to cope with a noise problem?

   Answer and reference:

9. Can you name one or more "toxic" operations that may be performed by men only?

   Answer and reference:

10. What special hazard is created by a nitric acid fire?

    Answer and reference:

SUNFLOWER SAFETY SHOWMANSHIP

H. J. Bigham, Safety Engineer
Hercules Incorporated
Sunflower Army Ammunition Plant

One of the most difficult facets of any safety program is creating and maintaining interest in the program at all levels of employees. Methods used to accomplish this are as varied as the plants and the personnel charged with implementing their safety programs. One fact, however, is common to all industrial plant employees. Today's workers don't hold still for preaching and dictating. They feel a freedom heretofore unknown and they have a taste for making up their own minds. The safety message must be sold to them.

Interest builders are to the safety man what advertising is to the sales manager. Advertising drills a brand name into the consumer's mind. When the time comes to choose between brands, more buyers take the brand with the familiar name. In the same manner safety publicity creates a favorable attitude toward safe work habits. A worker who has been conditioned to react favorably to safety is more likely to choose the safe way to do a job.

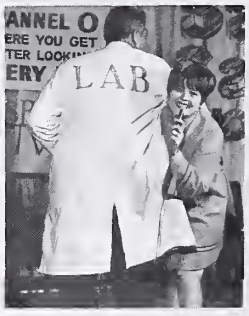
Creating and keeping a positive outlook among employees is the justification of many kinds of "goings-on" in safety programs. The Sam Safety Show presented at the Hercules Safety Theater, Sunflower Army Ammunition Plant, during the month of December 1968 was a radical departure from the common conception of a safety meeting. The show was a take-off of the popular Johnny Carson "Tonight" television program complete with music, talk and stand-up performances full of "Safety geared for today's living." The success of the program was demonstrated by 100 per cent attendance by all departments. Many employees returned on their own time to view it a second time and there was not a morning during the month when there was not a line of employees waiting to get into the theater before it opened. Advanced publicity, newspaper reviews, involvement of many departments in the production and careful planning were the secret of the show's success.

Shows and stunts are not a complete safety program. There is no substitute for sound safety engineering and the basics of safety work. Stunts alone will probably improve a safety record, but only temporarily. The prime objective of any positive safety program is to head off the accidents at the source. Shows, stunts and other publicity schemes, if set up and run with care and good taste, are the frosting on the cake and not the cake itself. Developing interest is only a start. Like training, maintaining interest in the safety program is a job that never ends.

Coming attractions are advertised in the Sunflower Army Ammunition Plant Safety Theater. Prominent display space was provided for portraits of Hercules Incorporated employees who were to be featured in the Sam Safety Show.

Charlie Folker, as a fashion creater, and Carol Adams, as his model, "Miss Treasure Chest", were featured in a skit that dealt with hoods, safety glasses, coveralls and safety shoes.

Two stars of the show were Norm Johnson (foreground) and Bonnie Decker (left). She led a sing-along type presentation of safety songs.



Jane Davenport, as "Goldie" mugged her way through a series of safety themes patterned after familiar television commercials.

The part of Sam Safety, the show's host, was played by Neal Finch (center), the Theater Safety Director. Shown with him are Shirley Cannaday and Charley Russell.

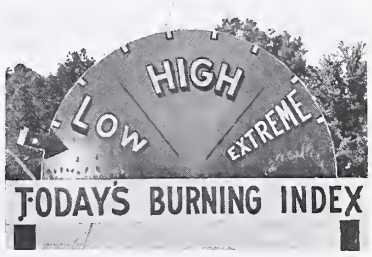
SIGNS HELP PREVENT FOREST FIRES

Chris D. Kneipp, Fire Chief
Remington Rand Office Systems Division
Sperry Rand Corporation
Louisiana Army Ammunition Plant

A major portion of the Louisiana Army Ammunition Plant consists of wooded and grassy areas. During the year weather conditions can create a serious fire threat to these areas.

In this area, as in others where there is a forest fire hazard, the weather forecasts contain information on the "burning index". The Fire Department at the Louisiana Army Ammunition Plant also receives specific information each day from the local Forestry Commission on the burning index. This information is derived from the weather conditions that exist on that day in our locality.

The Fire Department has installed "burning index" signs at three major intersections on the installation, to pass on this information to the employees at Louisiana Army Ammunition Plant. The accompanying photograph shows one of these signs.



The burning index consists of three categories that correspond to low, high and extreme hazards for grass and forest fires:

Green - Burning conditions low to moderate - No danger.

Yellow - Burning conditions high - Employees will use caution with fire. All cigarette butts will be snuffed out in vehicle ash trays.

Red - Burning conditions very high to extreme - Extreme caution will be exercised with fire. Smoking in vehicles, including locomotives or other locations, except those authorized as smoking areas, is prohibited.

Disciplinary action will be taken against violators.

These signs were fabricated in the plant carpenter and paint shops. They were made of three-fourths-inch exterior plywood and were inexpensive to construct due to the fact that some used material was utilized.

The arrow has a 60-watt light bulb inside it with red plexiglass covering the face. This arrow is moved and locked in place when it is necessary to do so.

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IF EVERY ONE

If every one who drives a car would lie a month in bed,
With broken bones and stitched up wounds or fractures of the head,
And there endured the agonies that many people do,
They'd never preach safety anymore to me or you.
If everyone could stand beside the bed of some close friend,
And hear the doctor say "No hope," before the fatal end,
The laws and rules of traffic I am sure we'd soon embrace.
If every one could meet the wife and children left behind,
And step into the darkened home where once the sunlight shined,
And look upon "The Vacant Chair" where Davy used to sit,
I'm sure each reckless driver would be forced to think a bit.
If everyone who takes the wheel would say a little prayer,
And keep in mind those in the car depending on his care,
And make a vow, and pledge himself to never take a chance,
The great crusade for safety then could suddenly advance.

■ *Author Unknown*

circa 1950 (?)

Here are the answers to the questions on pages 49 and 50. All questions were based on information contained in AMCR 385-224. A reference to the pertinent paragraph follows each answer:

1. No. Buildings, separated by intraline distance, may suffer substantial structural damage. Intraline distances are expected to protect buildings from propagation of explosions due to blast effects but not against the possibility of propagation due to missiles. Reference: Paragraph 1705a, AMCR 385-224.

2. For class 1 materials the minimum distance shall not be less than 100 feet. For all other classes of explosive materials the distance shall not be less than 300 feet. Reference: Paragraph 1721a, AMCR 385-224.

3. The rate of feed for machining high explosives should not exceed .035 inch per revolution. Reference: Paragraph 2615f, AMCR 385-224.

4. The lineal and rotational speed of tools used for the machining of cased and uncased explosives shall be maintained at the minimum necessary to perform the operation safely and efficiently. Reference: Paragraph 2615f, AMCR 385-224

5. Burning should not be repeated on previously burned-over plots within 24 hours, unless the burning area has been thoroughly soaked with water and an inspection of the plot by competent personnel has been

made to assure the safety of personnel during a subsequent buring operation. Reference: Paragraph 2715d, AMCR 385-224.

6. The United States Bureau of Mines or the Army Environmental Hygiene Agency approval is required for respiratory protective devices used by personnel employed in dusty or toxic atmospheres. Reference: Paragraph 1009, AMCR 385-224.

7. Wood and other carbonaceous materials affected by acids and their vapors should be kept to a minimum in a building being constructed for storage, handling and use of acid. Reference: Paragraph 1301, AMCR 385-224.

8. One or more of the following engineering methods can be applied to most noise problems:

   a. Elimination of the noise at its source.

   b. Isolation of noisy operations.

   c. Reduction of noise by insulation.

   d. Use of personal protective devices, such as ear defenders.

   Reference: Paragraph 1124, AMCR 385-224.

9. There are none. Women may be employed at any "toxic" operations that are safe for men as there is no satisfactory evidence that women are more susceptible than men to chemical intoxication. Reference: Paragraph 1104, AMCR 385-224.

10. Oxides of nitrogen, commonly called "nitrous fumes", are evolved in acid fires. These are exceedingly toxic. Reference: Paragraph 1308, AMCR 385-224.

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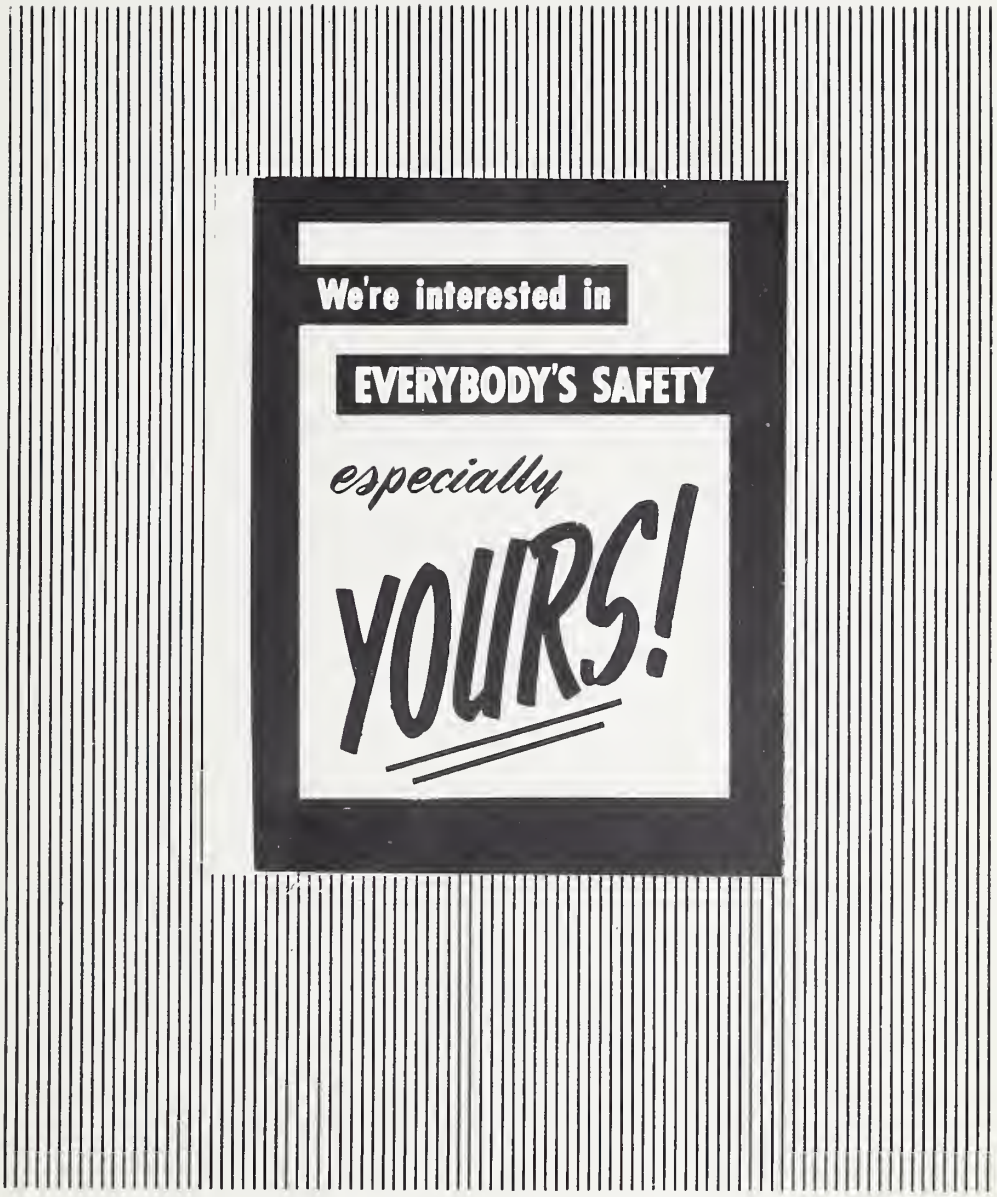
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EVERYBODY'S SAFETY
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FLARE

UNITED STATES ARMY MATERIEL COMMAND

WASHINGTON, D.C. 20315